

FORMATION OF METAL NANOWIRES FOR USE AS VARIABLE-RANGE
HYDROGEN SENSORS

ABSTRACT

5 The present invention provides for variable-range hydrogen sensors and
methods for making same. Such variable-range hydrogen sensors comprise a series
of fabricated Pd-Ag (palladium-silver) nanowires—each wire of the series having a
different Ag to Pd ratio—with nanobreakjunctions in them and wherein the nanowires
10 have predefined dimensions and orientation. When the nanowires are exposed to H₂,
their lattice swells when the H₂ concentration reaches a threshold value (unique to
that particular ratio of Pd to Ag). This causes the nanobreakjunctions to close leading
to a 6-8 orders of magnitude decrease in the resistance along the length of the wire
and providing a sensing mechanism for a range of hydrogen concentrations.

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